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## International stock market integration: Central and South Eastern Europe compared

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### ABSTRACT

We examine the international stock market comovements between Western Europe vis-à-vis Central (Czech Republic, Hungary and Poland) and South Eastern Europe (Croatia, Macedonia and Serbia) using multivariate GARCH models in the period 2006–2011. Comparing these two groups, we find that the degree of comovements is much higher for Central Europe. The correlation of South Eastern European stock markets with developed markets is essentially zero. An exemption to this regularity is Croatia, with its stock market displaying a greater degree of integration toward Western Europe recently, but still below the levels typical for Central Europe. All stock markets fall strongly at the beginning of the global financial crisis and we do not find that the crisis altered the degree of stock market integration between these groups of countries.

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## 1. Introduction

The economies in Central and Eastern Europe witnessed major structural changes during the last two decades. Many countries, especially in Central Europe, carried out ambitious reforms soon after the fall of communism, successfully integrated in European structures and after the initial period of transition experienced solid growth. On the other hand, some countries, especially in South Eastern

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Europe, progressed more slowly in creating a market-oriented economy and some important reforms have been undertaken only recently (Campos and Horvath, 2012).

In this article, we want to compare the stock market integration of these two groups – Central Europe and South Eastern Europe – with the developed markets and examine whether the degree of integration differs. While we know relatively much about stock market behavior in Central Europe (Égert and Kočenda, 2007; Hanousek and Kočenda, 2011; Kočenda and Égert, 2011), a systematic examination of stock market comovements in South Eastern European countries is, to our knowledge, missing. We want to bridge this gap and examine whether the degree of stock market comovements with developed markets differs from that in Central Europe. For this reason, we collect daily data on stock market indices from the Central European countries (Czech Republic, Hungary and Poland) and several South Eastern European countries (Croatia, Macedonia and Serbia) from 2006 to 2011. As regards the South Eastern European countries, we specifically focus on countries that used to be a part of Yugoslavia and are not integrated in the European Union.<sup>1</sup>

Although the financial systems in Central European and South Eastern European countries are largely bank-based, an analysis of stock market developments can still provide useful insights. First, it may help policymakers understand the nature of cross-country shock transmission in a timely fashion since unlike many other economic series, stock market data are available at a high frequency. Similarly, it may be useful to investment managers for international portfolio diversification. Second, although the stock markets in these countries are relatively small in size, they still possess predictive power for future economic activity and prices. Using the Czech data, Havranek et al. (2012) compare the forecasting accuracy of various financial variables such as credit growth, loan loss provisions, banking sector liquidity, share of non-performing loans and stock market index and find that the stock market index tends to provide more accurate forecasts for the macroeconomic environment than the remaining financial variables. Third, Baele (2004) puts forward that looking at stock market comovements is one way to assess financial integration. Clearly, financial integration has direct consequences for financial stability (see De Nicolo and Tieman, 2006; Fecht et al., 2008).

Our results suggest that Central European stock markets are highly integrated with the developed markets. The conditional correlations between Central European and Western European stock markets reach a value around 0.6, which is close to the correlation reported in the literature for the US and Canadian stock markets (see, for example, Longin and Solnik, 1995; Forbes and Rigobon, 2002). On the other hand, the degree of comovements between Serbian as well as Macedonian stock markets with developed markets is practically zero. The Croatian stock market evolves from nearly zero comovements at the beginning of our sample to values as high as those for Central Europe before the outset of the global financial crisis and subsequently falls to lower but still positive values during the crisis. The results for Croatia vis-à-vis other South Eastern European countries should not come as a surprise, as the stock market capitalization is greater in Croatia than in the remaining South Eastern European stock markets, financial reforms progressed faster and EU entry negotiations are in progress.<sup>2</sup>

The article is organized as follows. Section 2 discusses the related literature, while Section 3 describes the data. In Section 4 we briefly introduce the multivariate GARCH model. Section 5 presents the results. Concluding remarks are offered in Section 6. An Appendix A with additional results follows.

## 2. Related literature

This section briefly reviews the literature on stock market comovements that focuses on Central and South Eastern European countries. The literature typically employs either vector autoregression or vector error correction modeling to examine the short-term and long-term transmission,

<sup>1</sup> As concerns other former Yugoslavian countries with stock markets, Bosnia and Herzegovina is excluded, since the European Bank for Reconstruction and Development shows that the degree of financial reforms is still rather low. Slovenia is excluded since it is fully integrated into European structures (EU member since 2004 and euro area member since 2007).

<sup>2</sup> Even though it has to be acknowledged that stock market capitalization decreased in Croatia during the crisis and therefore the estimated stock market integration may be partly driven by the lower liquidity in this market.

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